

WE CLAIM:

1 1. An antimicrobial composition comprising a synergistic antimicrobial effective
2 amount of a mixture of:

3 (a) a first component including one or more aldehyde donor;
4 (b) a second component including a stabilizer; and
5 (c) a third component including a dehydroacetic acid or salt thereof.

1 2. The composition of claim 1 wherein the dehydroacetic acid salt is dehydroacetic
2 acid sodium salt.

1 3. The composition of claim 1 wherein the aldehyde donor is an alkanol-substituted
2 dimethyl hydantoin selected from the group consisting of 1,3-dimethylol-5,5-
3 dimethylhydantoin, 1-methylol-5,5-dimethylhydantoin, 3-methylol-5,5-dimethylhydantoin, 1-
4 methylol-3-methyloxymethylene-5,5-dimethylhydantoin, 1,3-dimethyloxymethylene-5,5-
5 dimethylhydantoin, or mixtures thereof.

1 4. The composition of claim 3, wherein the alkanol-substituted dimethyl hydantoin
2 is a mixture of dimethyloldimethylhydantoin and monomethyloldimethylhydantoin.

1 5. The composition of claim 1, wherein the aldehyde donor is selected from the
2 group consisting of imidazolidinyl urea, Quaternium-15, diazolidinyl urea,
3 bromonitropropane diol, methenamine, 5-bromo-5-nitro-1,3-dioxane, sodium
4 hydroxymethylglycinate, formalin, glutaraldehyde, polymethoxy bicyclic oxazolidine, 3,5-
5 dimethyl-1,3,5,2H-tetrahydrothiadiazine-2-thione, hexahydro-1,3,5-tris(2-

6 hydroxyethyl)triazine, hexahydro-1,3,5-triethyl-s-triazine, methyloxohydantoins, tetrakis
7 (hydroxymethyl) phosphonium sulfate, or mixtures thereof.

1 6. The composition of claim 1 wherein the stabilizer is dimethyl hydantoin or
2 derivative thereof.

1 7. The composition of claim 1, wherein the mixture is substantially free of iodine.

1 8. The composition of claim 1, wherein the mixture has a free formaldehyde
2 concentration of less than 0.2% by weight, based on 100% weight of the mixture.

1 9. The composition of claim 1 wherein the first component is present in the
2 mixture in an amount of between about 20% to about 95% by weight, based on 100% by
3 weight of the mixture.

1 10. The composition of claim 1 wherein the second component is present in the
2 mixture an amount of between about 0% to about 30% by weight, based on 100% weight of
3 the mixture.

1 11. The composition of claim 1 wherein the third component is present in the
2 mixture in an amount of between about 0.5% to about 40% by weight, based on 100% weight
3 of the mixture.

1 12. A method of preparing a synergistic antimicrobial composition which comprises
2 blending 20 to 95 parts of an aldehyde donor and 5 to 20 parts of a stabilizer or derivative
3 thereof to form a homogeneous mixture, mixing a solvent and 1 to 40 parts of DHA or salt

4 thereof with the foregoing mixture to obtain a homogeneous solution containing a total
5 formaldehyde content of at least 2% and less than 0.2% free formaldehyde.

1 13. A method of inhibiting the growth of or reducing microorganisms comprising
2 applying a synergistically antimicrobial effective amount of the composition of claim 1.

1 14. A method of inhibiting the growth of or reducing microorganisms in personal
2 care products such as shampoos, conditioners, rinses, creams, lotions, cosmetics, soaps, dental
3 products such as mouthwash, toothpaste, spray, denture cleaners and denture soaks, baby
4 wipes and other woven and non-woven wipes; household products such as laundry detergents,
5 hard surface cleaners, fabric softeners; and industrial products such as paint, wood, wood
6 treatment, paper board, sheet rock, paper pulp, ceiling tiles, textiles, adhesives, sealants,
7 leather, rope, plastics, petroleum, fuel, oil, and rubber and metal working fluids; comprising
8 applying an effective amount of the composition of claim 1 to the personal care product,
9 household product, or industrial product.

1 15. A method of inhibiting the growth of or reducing microorganisms in industrial
2 systems such as pulp and papermaking processing; water treatment systems; cooling water;
3 swimming pools and spas; decorative fountains; membranes; brewery pastures; toilet and
4 urinal applications; food and beverage sanitation; sporicidal formulations; sterilization of
5 clinical products and surgical instruments, and preservation, including clay slurry and starch,
6 comprising applying an effective amount of the composition of claim 1 to the industrial system.

1 16. A personal care, household, or industrial product comprising the composition of
2 claim 1.

1 17. A personal care, household, or industrial product which comprises an effective
2 amount of a mixture of a first component including one or more aldehyde donor, and a second
3 component including dimethyl hydantoin, and a third component including dehydroacetic acid.

1 18. The product of claim 17 wherein the product is a household or industrial
2 product selected from the group consisting of fabric softeners, laundry detergents, hard surface
3 cleaners, paint, wood, wood treatment, paper board, sheet rock, paper pulp, ceiling tiles,
4 textiles, adhesives, sealants, leather, rope, plastics, petroleum, fuel, oil, and rubber and metal
5 working fluids.

1 19. The product of claim 17 wherein the product is a personal care product selected
2 from the group consisting of shampoos, conditioners, rinses, creams, lotions, cosmetics, soaps,
3 mouthwash, toothpaste, spray, denture cleaners and denture soaks, baby wipes and other
4 woven and non-woven wipes.